CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
81 Higuera Street, Suite 200
San Luis Obispo, California 93401-5427

CLEANUP OR ABATEMENT ORDER NO. 98-37

Concerning

Union Oil Company of California

Petroleum Product Leaks in Avila Beach San Luis Obispo County

The California Regional Water Quality Control Board, Central Coast Region (hereafter Regional Board), finds:

1. Discharger: Union Oil Company of California, a California corporation, (dba UNOCAL) has discharged petroleum products including: gasoline, diesel, and crude oil to soil and ground water beneath the beach, roads, commercial and residential properties in and around the community of Avila Beach, California. These discharges were reportedly caused by historic leaks, spills and ruptures due to UNOCAL's operations, activities and use of their pipelines.

2. UNOCAL Pipeline Operations: Hydrostatic testing has routinely been conducted on pipelines beneath Front Street since 1975. These pipelines are no longer in use or proposed for future use.

3. Property Owners of Record: UNOCAL, the County of San Luis Obispo, the Port of San Luis Harbor District and the following Avila Beach property owners as listed in Exhibit A, currently are the owners of record overlying or adjacent to the soil and ground water pollution, as shown on Modified Figure 3.

4. History: The UNOCAL Avila Terminal facility has been used for petroleum hydrocarbon storage and transfer since 1906. Petroleum products were transferred to and from a tank farm on a bluff overlooking the town through a network of underground pipelines beneath Front Street to Avila Beach Drive, and over San Luis Obispo Creek bridge to the UNOCAL pier. Presently, the pipelines beneath Front Street and Avila Beach Drive are not active.

5. Geographic Setting: The community of Avila Beach is located on the northern end of San Luis Bay near Point San Luis in the County of San Luis Obispo. The area is roughly bordered on the north and west by San Luis Obispo Creek, on the east by the UNOCAL Avila Terminal facility, and on the south by the Pacific Ocean. The closest major highway is Hwy. 101 accessed by Avila Beach Drive. The Port of San Luis, San Luis Bay Inn Resort and Golf Course are nearby facilities.

6. Geology and Soils: Avila Beach is located on the southern flank of the Irish Hills. The community of Avila Beach is located within the Irish Hills of the southern Coast Ranges Province of California. The Irish Hills are part of the San Luis/Pismo structural block, composed of Miocene-Pliocene age Pismo Formation and Miocene Age Monterey Formation. The Irish Hills are bordered on the North by the Los Osos fault, on the west by the Hosgri fault, on the south by the Wilmar Ave/Oceano/Pecho faults, and on the east by the West Huasna/Edna faults.
   Soils beneath Avila Beach are primarily alluvial, fluvial, and shoreface deposits of

interbedded medium to coarse sand, silty sand, silt and clay. Much of the community is underlain by alluvial sediments derived from creek drainage, along with marine sediments derived from the Pacific Ocean. The alluvium overlies the Gragg Member of the Pismo Formation, which consists of white to light gray sandstone. Bedrock has been encountered as shallow as 15 to 30 feet, and deeper than 85 feet below ground surface.

7. Surface Water Resources: The community of Avila Beach is located on the northern end of San Luis Bay near the Port of San Luis. San Luis Obispo Creek is north and west of Avila Beach and the Pacific Ocean is to the south. Nearby surface waters also include: the San Luis Creek Estuary, and the Pacific Ocean.

8. Ground Water Resources: Ground water is shallow in the area, and varies from four feet beneath the main part of the beach to approximately ten feet inland. Avila Beach overlies the lower, downstream sub-unit of the San Luis Obispo ground water basin. Regional ground water lies an average of ten feet below ground surface in the town of Avila Beach and generally flows in a southwest direction towards the Pacific Ocean.

   There are 21 known water production wells within a mile of Avila Beach. Ground water is also known historically to be used as a domestic supply to the community.

9. State's Water Code: Discharge of petroleum and its chemical constituents into waters of the state is a violation of a prohibition contained in the Water Quality Control Plan, Central Coast Basin (hereafter "Basin Plan"). By discharging petroleum products into soil, as well as ground and surface waters, UNOCAL has created, or threatens to create, a condition of pollution in ground water beneath Avila Beach, San Luis Bay (Pacific Ocean), San Luis Obispo Creek and Estuary, and a nuisance condition in the community of Avila Beach.
10. Water Resource Beneficial Uses: The Basin Plan establishes numeric and narrative water quality objectives and beneficial uses for San Luis Obispo Creek (HSA 10.24) of which Avila Beach is a subarea/subbasin. The Basin Plan designates beneficial uses for ground water beneath Avila Beach (Chapter 2. Present and Potential Beneficial Uses, Page II-1, Column 2). The conditions and tasks contained in this Order, as they are met, will be in conformance with the Basin Plan goals and objectives.

11. Beneficial Uses of Ground Water: Pursuant to the Basin Plan, the present and potential beneficial uses of ground water beneath the Community of Avila Beach include domestic and municipal supply (MUN), agricultural supply (AGR), and industrial service supply (IND).

12. Beneficial Uses of San Luis Creek Estuary: Pursuant to the Basin Plan (Table 2-1, Identified Uses of Inland Surface Waters), the present and potential beneficial uses in San Luis Obispo Creek Estuary include ground water recharge (GWR); water contact recreation (REC-1); non-contact water recreation (REC-2); wildlife habitat (WILD); cold and warm fresh water habitat (WARM/COLD); migration of aquatic organisms (MIGR), spawning (SPWN), reproduction, and/or early development; preservation of biological habitats of special significance (BIOL); rare, threatened and endangered species (RARE); estuary habitat (EST); commercial and sport fishing (COM); aquaculture (AQUA); and shellfish harvesting (SHELL).

13. Beneficial Uses of Marine Waters: Pursuant to the Basin Plan (Table 2.2 Existing and Anticipated Uses of Coastal Waters) existing beneficial uses of marine waters surrounding and adjacent to Avila Beach include: water contact recreation (REC-1), non-contact water recreation (REC-2), industrial service supply (IND), navigation (NAV), marine habitat (MAR), shellfish harvesting (SHELL), commercial and sport fishing (COMM), rare, threatened, or endangered species (RARE), and wildlife habitat (WILD).

14. Regional Board Regulatory Actions: The Executive Officer issued Cleanup or Abatement Order (CAO) No. 94-85 (hereafter CAO No. 94-85) on August 25, 1994. CAO No. 94-85 contained ground water cleanup

levels but noted that soil cleanup levels were not included. At its September 8, 1994 meeting, the Board ratified the ground water cleanup levels and added to the order a soil cleanup level for total petroleum hydrocarbons (TPH). On November 23, 1994, the Regional Board informed UNOCAL that it would reconsider the soil cleanup level.

15. At its March 10, 1995 meeting, the Regional Board adopted a preferred alternative soil cleanup level for TPH of 100 parts per million (ppm). The Regional Board deferred establishing a final soil cleanup level in a Cleanup or Abatement Order until an Environmental Impact Report had been prepared and requirements under the California Environmental Quality Act (CEQA) had been satisfied.

16. On October 19, 1995, the Executive Officer issued CAO No. 95-89 requiring UNOCAL to remediate (excavate) contaminated soil and ground water on the western end of Avila Beach. This Order was issued when UNOCAL identified an area on the western portion of beach, due to a possible threat of release of hydrocarbons to the marine environment resulting from winter storm beach sand erosion. Between December 1995 and January 1996, UNOCAL successfully excavated 5,700 cubic yards of contaminated hydrocarbon soil substantially reducing this threat.

17. On August 27, 1996, the Executive Officer issued CAO No. 96-42 requiring UNOCAL to perform interim beach protection, further plume delineation, and providing a schedule for beach and community-wide remediation.

18. On December 6, 1996, the Executive Officer issued CAO No. 96-56 requiring further investigations, characterization of areas surrounding Avila Beach, including the UNOCAL Avila Terminal Facility and associated pipelines. CAO No. 96-56 also required an investigation of the mobility of the dissolved and free-phase hydrocarbons.

19. On August 25, 1994, the Regional Board established Monitoring and Reporting Program No. 94-85. This Program was revised June 5, 1997, to include sampling on a quarterly basis to provide more comprehensive and timely representative data on soil and ground water conditions.

20. Site Characterization: Numerous site assessments have been conducted by UNOCAL since 1989. The Regional Board's administrative report and correspondence file reflects this. Based upon current data and information submitted by UNOCAL and confirmed by: a) An independent site assessment from the consultant Arthur D. Little; b) Regional Board split sample laboratory analysis; c) Site assessment work by a consultant from the County for the Health Study, delineation of the vertical and lateral extent of pollution beneath the Front Street, the beach and properties North of Front Street as shown on Modified Figure 3, are deemed sufficiently characterized to establish pre-remediation conditions.

21. Previous Remedial Actions: Three types of remedial action have been undertaken by UNOCAL since contamination was discovered on in 1988: a) the soil vapor extraction system, b) the West End Excavation in 1995, and c) periodic sand augmentation.

    Soil Vapor Extraction System - Installed 1992. The soil vapor extraction system installed in 1992, is no longer effective in remediating the remaining petroleum contamination beneath Front Street, and the North of Front Street properties.

    West End Beach Excavation - Completed in January 1996, UNOCAL estimated the project achieved a 95% percent mass removal of hydrocarbons with an excavation type project.

    During the winter season of 1996/97, UNOCAL augmented the eastern portion of Avila Beach with dredged sand from Port San Luis Harbor. This augmentation was to provide an interim level of protection (four feet) against the possibility of daylighting hydrocarbons. A similar project was implemented during the winter 1997/98 season.

22. Impacts to Ground Water and Surface Waters: Substantial evidence indicates hydrocarbons in soil, both in the saturated and unsaturated zone, are providing a continuous source of water quality degradation to ground and surface waters.

23. Geographically Impacted Areas: Figures 1 and 2 generally depict areas of soil and ground water impacted by petroleum product releases.

24. Hydrocarbon Mass Balance: The following approximate quantities of petroleum hydrocarbons reside in soil beneath Avila Beach: 420,000 gallons of petroleum products reside beneath the Beach, Front Street, North of Front Street, within the intertidal plume and several outer plumes (e.g., San Antonio, San Juan Ave Plume, etc.). Petroleum products are intermixed in the subsurface into three hydrocarbon ranges in the approximate percentages: 6% gasoline, 80% diesel and 14% crude oil. These mass quantities of hydrocarbons are distributed geographically in the approximate percentages: 28% Front Street, 26% North of Front Street, 7% Intertidal, 39% Beach, 0.3% Outer Plumes.

25. Free Phase Product Occurrence: Free phase or separate phase hydrocarbons have been observed as sheening and product droplets in limited cases (monitoring wells). Separate phase hydrocarbons do, however, reside as residual saturation within the soil pore matrix.

26. Joint Powers Agreement: In the Fall of 1995, this Regional Board and the County of San Luis Obispo entered into a Joint Powers Agreement to jointly exercise their authority under the California Environmental Quality Act (CEQA) to perform environmental review pertaining to the UNOCAL remediation efforts in Avila Beach. In the agreement, the County and the Regional Board agreed to act cooperatively as "Co-Lead" agencies with respect to the application of CEQA to the project and projects that constitute UNOCAL's Avila Beach remediation project.

27. Environmental Impact Report: On May 14, 1997, the Draft Environmental Impact Report (EIR) was released by the consultant, Arthur D. Little, to the public for a 45 day public comment period. Two public workshops in the community and one Board workshop were held during the Draft EIR public comment period to enhance public knowledge and input. The public comment period ended July 14, 1997.

28. The Draft EIR analyzed UNOCAL's project and three alternatives to the project. The consultant identified the environmentally superior alternative as phased excavation of the beach, Front Street and portions of the town which overlie the hydrocarbon plume.

29. Based on the Draft EIR, the Army Corps of Engineers determined an Environmental Impact Statement (EIS) would be needed to be prepared for that portion of any remediation project that fell within their jurisdiction (below the mean high tide line).

30. On November 14, 1997, a Draft EIR/EIS was released for public review. A 45 day public comment period was initiated, and Notice of Availability was published in the Federal Register.

31. On February 17, 1998, a Final EIR/EIS was released to the public, including a response to comments package. Staff from the Regional Board, County and the Army Corps of Engineers reviewed the comment responses for completeness and adequacy prior to EIR/EIS finalization.

32. On February 26, 1998, the County of San Luis Obispo Planning Commission considered and certified the Final EIR.

33. On April 3, 1998, the Regional Board considered and certified the Final EIR in Resolution No. 98-03.

34. Ground Water Cleanup Levels: Cleanup levels for ground water are already established in CAO No. 94-85, ratified by the Board on March 10, 1995. Soil cleanup levels are established in this Order based on the existing ground water cleanup levels. Hydrocarbons in soil are a source of ground water pollution. Soil cleanup levels are set as necessary to assure that ground water cleanup levels will be achieved.

35. Water Code Exceedances: Ground water concentrations of petroleum hydrocarbons at Avila Beach have consistently exceeded ground water cleanup levels established by the Board on September 9, 1994, in CAO No. 94-85.

36. Leachability Analyses: Two laboratory leaching extraction methods: WET (Waste Extraction Test) and USEPA Method 1212 - SPLP (Synthetic Precipitation Leaching Procedure) were used to determine leachability of hydrocarbons to ground water. Leachability results were used as one basis for establishing soil cleanup levels protective of ground and surface waters. UNOCAL and Regional Board data were examined and a back calculation was made to see what contaminant level in soil would be necessary to support 1 ppm TPH level in water. Laboratory results, graphing and calculations support a soil cleanup level of approximately 100 ppm TPH to achieve 1 ppm TPH in water.

37. Hydrocarbon Hazards: Several components of petroleum products and crude oil are hazardous, and could produce an increased risk of cancer in humans if concentrations exceed Maximum Contaminant Levels established by the United States Environmental Protection Agency or California Department of Health Services.

38. County Health Study: In Spring of 1997, the County of San Luis Obispo contracted for a Health Study. The Draft Phase I Health Study report was released on January 5, 1998. The study found that no current health hazard exists in Avila Beach unless persons come in chronic contact with contaminated soil.

39. Nuisance: Contaminated soils and ground water are at concentration levels for TPH which cause a condition of nuisance by obstructing the free use of property, interfering with the comfortable enjoyment of life or property, and affect at the same time an entire neighborhood and/or a considerable number of persons. The extent of the annoyance or damage inflicted upon individuals may be unequal.

40. State Water Resources Control Board Resolution No. 92-49 (as amended on April 21, 1994, hereafter SWRCB Res. No. 92-49): requires that all actions for cleanup and abatement conform to the provisions of the SWRCB Resolution No. 68-16 (Anti-Degradation Policy) and to applicable provisions of Title 23 California Code of Regulations Chapter 15. (SWRCB Res. No. 92-49, Section III.F.1).

41. SWRCB Resolution No. 92-49, Section III G., provides the Regional Board shall: "Ensure that dischargers are required to cleanup and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible; in approving any alternative cleanup level less stringent than background, apply Section 2550.4 of Chapter 15..., any such alternative cleanup level shall:

    a. Be consistent with maximum benefit to the people of the state;

    b. Not unreasonably affect present and anticipated beneficial use of such water;

    c. Not result in water quality less than that prescribed in the “Water Quality Control Plans and Policies adopted by the State and Regional Water Boards."

42. SWRCB Resolution No. 92-49: provides that the goal for cleanup should be to remove pollutants to background levels. If a Regional Board determines that achieving background is not feasible it may set a less stringent cleanup level. However, the cleanup level must be the most stringent level that is technologically and economically achievable and in no case can the cleanup level exceed the level needed to protect current and designated beneficial uses of the receiving water. Also the cleanup level must be stringent enough that it does not pose a

threat to public health or safety. Finally the cleanup level must be consistent with the maximum benefit to the people of the state.

The Regional Board has already determined that it is not feasible to achieve cleanup to background because it set a ground water cleanup level that exceeds background but is protective of beneficial uses. The soil cleanup level in CAO No. 98-37 is necessary so that the remaining petroleum in soil will eventually allow the ground water cleanup level of 1 ppm TPH to be achieved. Soil levels examined in the County's Draft Phase I Health Study report greatly exceed the proposed soil cleanup levels. It is logical to extrapolate that a 100 ppm TPH soil level achieved in the final cleanup project will not pose a health threat. Finally, once required remediation is complete (excavation and enhanced bioremediation) natural bioremediation will likely reduce soil levels to less than 100 ppm TPH. It should also be noted that 100 ppm TPH in soils is the milestone cleanup level referred to in secondary mortgage agency guidelines for the purpose of determining that a property is suitable for a mortgage.

43. Remediation: The remediation project will be completed by excavating all polluted portions of Avila Beach as shown in Modified Figure 3 (except the San Luis Creek Plume, the East Front Street Plume and the Intertidal Zone Plume) in accordance with Order No. 98-37. This Order requires remediation of the East Front Street Plume by natural bioremediation and requires UNOCAL to monitor the bioremediation progress. This Order does not require remediating the Avila Terminal Facility (Tank Farm), the Intertidal Zone Plume, San Luis Creek Plume, the West of San Luis Obispo Creek Pipeline Plume, the Former Loading Station Plume, and any other soil contamination that is discovered through future site characterization efforts. These areas and others are deferred until the completion of additional studies, and further site characterization. These areas may be addressed in subsequent CAOs.

44. Excavation Standards: Excavation will not immediately achieve the soil cleanup level mandated in this Order - 100 ppm TPH. However, excavation will remove such a high percentage of the mass of petroleum waste that natural bioremediation is expected to achieve this cleanup level in a relatively short period of time, and eventually will result in pollutant levels that may be less than cleanup levels. Because cleanup levels will not be achieved by excavation alone, this Order includes excavation performance standards that indicate when excavation is complete.

45. Achieving Cleanup Levels: The only remediation method that has been identified to achieve the soil and ground water cleanup levels established in this Order and CAO No. 94-85 is excavation. Therefore, this Order contains excavation standards.

46. Previous Cleanup and Abatement Orders: CAO No. 94-85, CAO No. 96-42, and CAO No. 96-56 remain in full force and effect. The provisions of CAO No. 98-37 shall take precedence over any provision of previous CAOs that is in conflict with this Order.

IT IS HEREBY ORDERED, pursuant to Sections 13267 and 13304 of the California Water Code, UNOCAL, its agents or assigns, shall comply with the following tasks and associated compliance dates:

CLEANUP LEVELS/EXCAVATION PERFORMANCE STANDARDS AND NORTH OF FRONT STREET CRITERIA **- UNOCAL shall complete excavation within all areas to the 100 ppm TPH contour line as generally defined in Modified Figure 3, except for the San Luis Creek, the San Antonio Street, and Intertidal plumes. UNOCAL shall undertake further site characterization to more precisely delineate the 100 ppm TPH contour line and submit these results to further delineate this contour line prior to excavation. UNOCAL shall excavate the San Antonio Street Plume as specified below.**

Cleanup of soil and ground water will be considered complete when pollutant concentrations are equal

to or less than the cleanup levels specified below:

I. Avila Beach - East and West of the Pier and Front Street :

Constituent	Ground Water (ug/L or ppb) (Established in CAO No. 94-85)	Soil (mg/kg or ppm)
Benzene	1.0	
Toluene	100	
Ethylbenzene	680	
Xylene	1000	
Total Petroleum Hydrocarbon (TPH) Gasoline (C4-C10) Diesel (C10-C25) Crude (C25-40)	1000 ppb or 1 ppm	100

II. North of Front Street Properties:

Constituent	Ground Water (ug/L) (Established in CAO No. 94-85)	Soil (mg/kg or ppm)
Benzene	1.0	
Toluene	100	
Ethylbenzene	680	
Xylene	1000	
Total Petroleum Hydrocarbon (TPH) Gasoline (C4-C10) Diesel (C10-C25) Crude (C25-40)	1000 ppb or 1 ppm	100

North of Front Street Properties Criteria:

UNOCAL shall remediate properties located north of Front Street based on the following criteria:

1. All UNOCAL owned lots/parcels, vacant or developed, shall be remediated according to the excavation standard outlined below.
2. All property with owners other than UNOCAL and vacant shall be remediated according to the excavation standard outlined below. This includes the San Juan Avenue Plume (Vacant Lot).
3. All property with owners other than UNOCAL that contain structures of record and the owner agrees to excavation shall be remediated according to the excavation standard at UNOCAL's expense.
4. Private property owners not wishing to remediate their properties according to the excavation standards outlined below shall enter into negotiations with the Regional Board so that additional remediation alternatives may be considered that meet the Regional Boards' water quality objectives.

San Antonio Street Plume:

UNOCAL shall excavate the San Antonio Plume to the following approximate geographic boundaries (as shown on Modified Figure 3): East Boundary is GB-185; West Boundary is GB-182; North Boundary is GB-188; South Boundary is the edge of the street asphalt curb. Offsets to these boundaries may be approved by

the Executive Officer to account for structural integrity, worker safety and utilities. The depth of the excavation will not exceed 11 feet, or the bottom of any UNOCAL pipeline, which ever is the greater. Excavation of the San Antonio Street Plume will be considered complete once compliance with the requirements of this paragraph and proper backfilling are complete, not withstanding the Excavation Performance Standards, below.

East Front Street Plume:

Remediation of the East Front Street Plume shall be by natural bioremediation and UNOCAL shall monitor bioremediation progress.

III. Excavation Performance Standard:

Excavation work will be considered complete once it complies with the standards below and backfilling is complete.

1. At least 95% of petroleum mass shall be removed in remediation of the soil plume. Percentage estimates shall be made by UNOCAL, subject to Regional Board review and concurrence.
2. The mean concentration in samples collected within the remediated areas shall not exceed 500 ppm TPH (reported as total).
3. Samples at the limits of all remediated areas shall be collected on at least 25 foot centers, or as directed in the field by the Executive Officer (designated Regional Board staff or monitor).
4. Samples collected at the limits of the remediated areas shall not contain a maximum TPH concentration exceeding 1000 ppm (reported as total). The Executive Officer may grant a few exceptions (not to exceed 5% of the number of sampling points based upon 25 foot centers for an entire excavation area). This number is to be determined before excavation begins.
5. Nutrients and other appropriate compounds shall be added in sufficient quantities to remediate residual contaminant levels.
6. UNOCAL shall conduct post-excavation ground water monitoring. Monitoring wells destroyed due to remediation shall be replaced if the Executive Officer determines they are needed to establish a sufficient monitoring network.
7. The values used to calculate the mean and maximum TPH concentrations will be the final sampling results. The sampling will be done on a grid, to assure neutral method for sampling locations. The grid shall be configured to ensure that all lots North of Front Street are sampled. If sampling results reveal that the above criteria has not been met, remediation will continue, and then resampling may again be conducted.

IV. Avila Terminal Facility, Intertidal Zone and Other Areas

Cleanup levels are deferred in these Areas until the completion of additional studies and further site characterization. Cleanup levels will be established for the UNOCAL Avila Terminal Facility, Intertidal Zone and Other Areas in subsequent Regional Board Cleanup Orders. "Other Areas" is defined as the San Luis Creek Plume, the West of San Luis Obispo Creek Pipeline Plume, the Former Loading Station Plume, and any other soil contamination that is known or discovered through future site characterization efforts.

V. Implementation of Mitigation Measures Under CEQA:

UNOCAL shall incorporate and implement into the work required by this Order mitigation measures identified in Attachment 1. These mitigation measures are described in Regional Board Resolution No. 98-03.

VI. TASK REQUIREMENTS AND COMPLIANCE DATES

A. Final Avila Beach Cleanup Plan and Implementation

UNOCAL, by May 3, 1998, will submit a Final Cleanup Plan and Sampling Plan that addresses all hydrocarbon contaminated areas within the 100 ppm TPH contour line as generally defined in Modified Figure 3, (except for the San Luis Creek and Intertidal plumes). This Final Cleanup Plan and Sampling Plan must specify how it complies with, and achieves, ground water cleanup levels set forth in CAO No. 94-85, and the 100 ppm TPH soil cleanup level, excavation performance standards and North of Front Street criteria set forth in this Order. In addition, the plan must also address how the plan: a) minimizes the discharge of dissolved phase hydrocarbons to marine and surface waters; and b) protects Basin Plan, and this Order's established beneficial uses.

B. Permit Application

a) UNOCAL shall submit a comprehensive permit application plan to the Regional Board by May 1, 1998. This plan shall list all local, state and federal permits that UNOCAL must or may have to acquire to begin implementing remediation work by December 1, 1998 as required by this Order. The plan shall list the date by which UNOCAL will apply for each permit. UNOCAL shall apply for permits in accordance with this plan.

b) UNOCAL shall timely apply for all permits as necessary to complete, and so as not to delay, Final Cleanup Plan as directed by this Order. UNOCAL shall make good-faith efforts to obtain all permits necessary to commence the actions required in this Order.

C. Avila Beach Cleanup Implementation

UNOCAL, immediately upon receiving necessary permit approvals, shall promptly commence and complete implementation of the Final Cleanup Project, in accordance with this Order, but no later than December 1, 1998. If all permit approvals have not been received by this date, UNOCAL shall submit a report detailing the reasons why approvals have not been obtained, and affirmative actions taken by UNOCAL to obtain permit approvals. UNOCAL shall complete excavation no later than December 1, 2000. If the Executive Officer determines UNOCAL cannot comply with the completion deadline due to causes beyond their control he may extend the deadline.

The intent of the actions required by this Order is to improve ground water quality to achieve ground water cleanup levels and to prevent discharges of hydrocarbons to surface water. If the actions required by this Order fail to meet that goal to the satisfaction of the Executive Officer, the Regional Board may require additional corrective action. Nothing in this Order limits the authority of the Regional Board to require additional investigation and remediation.

D. Monitoring and Reporting Program No. 94-85

1. UNOCAL shall continue to perform quarterly Ground Water Monitoring under Revised Monitoring & Reporting Program No. 94-85 (Revised 6/5/97) and any future revisions, approved by the Executive Officer.

2. UNOCAL shall continue to submit quarterly Monitoring Reports under Revised Monitoring & Reporting Program No. 94-85 on the 20th day of January, April, July, October of each year.

E. Additional Site Assessment Work

UNOCAL shall undertake additional site assessment work as determined necessary and approved by

the Executive Officer to fully characterize the horizontal and vertical extent of hydrocarbon contamination within the town of Avila Beach.

F. Reporting

UNOCAL shall submit quarterly reports to the Regional Board of completed cleanup activities, including implementation of mitigation measures specified in the CEQA Findings report attached to this CAO. The reports shall detail progress made on all permits necessary to implement the final cleanup project, all remediation actions taken, sampling results, and amounts of petroleum hydrocarbons removed through the remediation project. Reports shall be submitted by the first day of the second month following the end of the quarter (i.e., 1st Quarter Report [Jan-Mar] is due by May 1; 2nd Quarter Report [Apr-Jun] is due by August 1; 3rd Quarter Report [Jul-Sep] is due November 1; and, 4th Quarter Report [Oct-Dec] is due by February 1,) and quarterly thereafter until all remediation activities have been completed to the Regional Board's satisfaction.

All technical and monitoring reports required in conjunction with this Order are required pursuant to Sections 13267 and 13304 of the California Water Code. All work requiring engineering or geologic evaluations/judgments must be performed under the direction of, and signed and stamped by, an appropriately registered professional (e.g., Registered Civil Engineer or Registered Geologist) fully competent and proficient to do the work performed.

In addition, UNOCAL will submit and distribute copies of each task report as described above and by the assigned compliance date as follows: the Regional Board (2 copies), the County of San Luis Obispo (2 copies), the California Department of Fish and Game (1 copy), the California Coastal Commission (1 copy), the Federal Environmental Protection Agency (1 copy), the Army Corps of Engineers (1 copy), and the Avila Beach Community Services District (1 copy).

FAILURE TO COMPLY WITH THE PROVISIONS OF THIS ORDER MAY SUBJECT YOU TO FURTHER ENFORCEMENT ACTION, INCLUDING, BUT NOT LIMITED TO, ASSESSMENT OF CIVIL LIABILITY UNDER SECTIONS 13268 AND 13350 OF THE WATER CODE AND REFERRAL TO THE DISTRICT ATTORNEY OR ATTORNEY GENERAL FOR INJUNCTIVE RELIEF AND CIVIL OR CRIMINAL LIABILITY.

ORDERED BY_____
Executive Officer

_____
Date

ATTACHMENT 1
MITIGATION MEASURES

OB-3- modified: *Containment and cleanup equipment shall be kept on site during all excavation including site preparation. A contingency plan for containment and cleanup of any spills shall be prepared prior to initiation of remedial activities.*

MB-1 *Limit construction of the wave-energy break and grading of intertidal sands to periods of low tide.*

MB-2 *Provide marine oil-spill response equipment on site during remediation of beach plumes adjacent to the ocean (defined as Areas 3, 4, 5, and 6 in the Final EIR/S).*

MB-3 *Collect weekly marine water and sediment samples in intertidal waters during remediation of beach plumes and analyze them for elevated hydrocarbon concentrations. This would provide early detection of contaminated material seeping from the cofferdam.*

MB-4- modified: *If a marine spill occurs, conduct marine toxicity tests as required by California Department of Fish and Game on the discharged contaminants and compare with criteria 4 and 5 (as defined in the Final EIR/S). This measure would help evaluate the potential impact of the spill on marine resources and would guide response efforts.*

PS-10 *An oil spill response plan shall be developed to the satisfaction of the California Department of Fish and Game, and oil spill response equipment, as specified in the approved oil spill response plan, shall be maintained to control and cleanup any petroleum hydrocarbon releases.*

GW-5 *During pilot testing and during remedial actions, UNOCAL shall monitor ground water quality (i.e., petroleum hydrocarbons and pH) downgradient of the stabilized structure*

on a schedule determined by the Regional Board. The ground water should be monitored with permanent ground water monitoring wells, temporary wells (microwells) or using ground water sampling equipment such as the "hydropunch".

GW-19 *Prior to initiating work, a Spill Response Plan shall be prepared with provisions for responding to spills and releases of regulated substances into surface water bodies. The plan shall have provisions for protecting surface water and provide response actions in the event of a release of sediment or suspended or settleable materials. The plan will also account for extreme oceanographic conditions that can affect the integrity of spill containment equipment. The response plan shall be submitted to the County of San Luis Obispo Environmental Health Department and Regional Board for review and comment prior to implementation.*

GW-20-modified: *During emergency remedial actions on the west end of the beach, the contaminated foam was contained inside PVC booms deployed along the shoreline of San Luis Obispo Creek. The PVC boom appeared to successfully contain most of the foam that was generated. However, petroleum sheens were observed inside and outside the PVC containment boom. PVC and sorbent booms should be deployed while installing the shoring; however, an alternative method of containment may be employed to contain sheens, films, foams, etc., observed outside of the boom deployed along the shoreline.*

GW-21-modified: *On November 24, 1995, the PVC boom broke releasing the foam and visible film to the surface water of San Luis Obispo Creek and the Pacific Ocean. Contaminated foam washed up on the beach and had to be physically removed with shovels and brooms. As a standby measure PVC booms may be deployed along the shoreline of the ocean and the creek while construction is in progress as recommended above. To avoid the incident on November 24, 1995, (release of foam into the creek and ocean) the foam and visible film should be removed regularly (i.e., 2 to 4 times per day) and contained for disposal.*

GW-22-modified: *The beach will be closed to public access in the vicinity of construction as part of the site health and safety plan. The portions of the beach effected by the remediation project should be closed to recreational swimming during beach construction.*

GW-27-modified: *UNOCAL shall monitor San Luis Obispo Creek and the ocean for turbidity during wet weather periods while construction activities near the Creek and Ocean are going on. Turbidity should be monitored upstream of the project in San Luis Obispo Creek and in the surf zone of San Luis Harbor to determine background levels of turbidity in surface water bodies. If turbidity levels exceed 20 percent of background conditions in San Luis Obispo Creek or the ocean, construction activities shall be evaluated until remedial actions can be taken.*

GW-28 *Staging areas, equipment storage areas, materials storage areas, drilling fluids, and soil stockpiles shall be located away from surface water bodies to minimize the potential for releases into surface water.*

GW-29 *Equipment and materials, particularly materials that can cause turbidity and sedimentation, shall be stored inside bermed areas where surface runoff can be controlled and kept away from surface water.*

GW-30 *Silt fences or other containment devices shall be used in areas where sediment, suspended materials, and settleable materials could be released to surface water.*

Provisions for these devices should be documented in the Spill Response Plan.

GW-31 *Construction best management practices shall be implemented to minimize the potential for accidental release of materials that can cause turbidity, sedimentation, or result in suspended or settleable materials in surface water.*

GW-52 *UNOCAL shall propose a method of remediating residual hydrocarbons levels in soil and ground water left in the excavation following the removal actions, or monitoring remediation by natural attenuation following excavation. The proposal should be documented and submitted to the Regional Board for review and approval. (Based upon the proposal submitted, and approved, one and/or more of the following mitigation measures will be implemented):*

a) GW-53-<u>modified:</u>Backfill the excavation with no treatment of the ground water allowing for remediation of dissolved phase contaminants in ground water and residual levels left in the soil by natural attenuation. Residual soil and ground water will be monitored, through the Regional Board's Monitoring Program No. 94-85 or modification/revisions to this program (and possibly environmental fate and transport modeling) as a means to evaluate the progress of the intrinsic bioremediation processes and to determine if dissolved phase contaminants continue to impact ground and surface waters above cleanup levels.

b)GW-54-modified: After skimming operations and preferably before backfilling the excavations, any extracted ground water shall be treated. The treated ground water should be discharged or disposed of in accordance with applicable environmental laws and regulations. A plan to treat and dispose of extracted ground waters would be submitted to the Regional Board for review and approval. Ground water monitoring would be required through the Regional Board's Monitoring and Reporting Program No. 94-85 or modification/revisions to this program, as a means to evaluate the progress of the intrinsic bioremediation processes, and to determine if dissolved phase contaminants continue to impact ground and surface waters above cleanup levels.

*c)GW-55-<u>modified:</u> After skimming operations and the removal of free product, any extracted ground water from the excavation shall b**e** discharged or disposed of in accordance with applicable environmental laws and regulations. A plan to dispose of extracted free product and treat ground waters would be submitted to the Regional Board for review and approval. Ground water monitoring would be required through the Regional Board's Monitoring and Reporting Program No. 94-85 or modification/revisions to this program as a means to evaluate the progress of the intrinsic bioremediation processes and to determine if dissolved phase contaminants continue to impact ground and surface waters above cleanup lev**e**ls.*

d)GW-56-<u>modified:</u> After skimming operations and the removal of free product from the surface of ground water, intrinsic bioremediation should be enhanced with the addition of biodegrading nutrients and other appropriate additives based upon a plan developed by UNOCAL pursuant to GW-52 and approved by the Regional Board to remediate residual hydrocarbons. Ground water monitoring will be required through the Regional Board's Monitoring and Reporting Program No. 94-85 or modification/revisions to this program as a means to evaluate the progress of the intrinsic bioremediation processes and to determine if dissolved phase contaminants continue to impact ground and surface waters above cleanup levels.

e)GW-57-<u>modified:</u> After backfilling the excavations with treated sand or imported fill, dissolved oxygen levels should be enhanced in ground water with the addition of biodegrading nutrients or other appropriate additives based upon a plan prepared by UNOCAL pursuant to GW-52 and approved by the Regional Board to remediate residual hydrocarbons. Ground water monitoring would be required through the Regional Board's Monitoring and Reporting Program No. 94-85 or modification/revisions to this program as a means to evaluate the progress of the intrinsic bioremediation processes and to determine if dissolved phase contaminants continue to impact ground and surface waters above cleanup levels.

GW-58 *The foam/mousse shall be skimmed from the ground water as it is being generated during backfilling and contained for disposal. The foam will be sampled and analyzed for TPH and BTEX.*

GW-59 *The foam shall be removed regularly (i.e., 2 to 4 times per day) and contained for disposal. The foam should be sampled and analyzed for TPH and BTEX.*

D-9 *Excavation activities associated with the San Antonio Street Plume shall be subject to specific BMPs established under the project's National Pollutant Discharge Elimination System (NPDES) Construction Activity Storm Water Permit. These BMPs may include, but are not limited to, utilization of hay bales, silt fences, or other sediment barriers to control movement of excavated sediments to downslope beach areas.*

D-11 *Excavation activities shall include a phased Drainage Control Plan, that specifically identifies drainage control Best Management Practices (BMPs) for each phase of the excavation within the Front Street and north of Front Street areas. The Plan shall address both conveyance of runoff from upstream areas, as well as potential downstream sedimentation and capacity impacts. The plan shall be reviewed and approved by both the Regional Board and the San Luis Obispo County Building and Planning Department.*

D-12 *As part of design review, the proposed project shall obtain a NPDES Construction Storm Water Activity Permit from the Regional Board.. The permit's pollution prevention plan shall specify BMPs to reduce erosion of disturbed soils within construction staging areas. These may include, but are not limited to: utilization of hay bales, silt fences, sediment traps, coffer dams, containment berms, or other measures identified by the applicant's contractor. It is recommended that the projects NPDES Pollution Prevention Plan be keyed to individual excavation phases in order to efficiently address potential erosion impacts.*

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